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EXAMINER
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2874	

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Please find below and/or attached an Office communication concerning this application or proceeding.

DETAILED ACTION

In response to the applicant's amendment received on April 14, 2003, all requested changes to the claims have been entered.

Applicant's arguments with respect to claims have been considered but are deemed to be moot in view of the new grounds of rejections. The previously applied rejections of claims are withdrawn. The following rejections are now applied as the result of discovery of new references. This action is **not** made final. Any inconvenience to applicant is regretted.

Claim Objections

Claim 59 is objected to because of the following informalities: In lines 11-12 of claim 59, the phrase "assembly **may** deflect a light beam" renders the claim unclear. It should be changed to –assembly deflects a light beam--. In line 9 of claim 59, --gimbaled—should be added before the term "micromirror" in order to provide antecedent basis to the term "the gimbaled micromirror" in claims 60-62. Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 44-45, 47, 51, 55, and 70 are rejected under 35 U.S.C. 102(e) as being anticipated by Swartz et al (US 6,102,294).

Swartz et al discloses a light scanning system (Fig. 9) comprising a single substrate body (139) defined by an upper surface and formed with at least one cavity including an upper cavity formed on the upper surface of the substrate body and a primary optical path for accommodating the passage of a light beam aligned in a predetermined orientation with the upper cavity; and a beam steering assembly (136, 138) having a steerable element (136) hingedly secured to the substrate (139) adjacent the upper cavity for receiving and reflecting the light beam to controllably directing the light beam. The primary optical path is formed from a laser (112) to the mirror (136).

As to claim 47, Swartz et al discloses a groove (137) between the upper cavity and the laser for accommodating the passage of the light beam.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was

not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claim 46 is rejected under 35 U.S.C. 103(a) as being unpatentable over Swartz et al and Swartz (US 5,625,483 which is parent case of Swartz et al)

As discussed above, Swartz et al substantially discloses all the limitations of claim 46, but fails to disclose a waveguide for accommodating the passage of a light beam.

However, it is well known in the art to couple a waveguide to a laser for efficiently guiding the light and reducing loss. As shown in the Swartz et al, some of the light may get lost between the laser and the mirror. It is highly desirable in the beam steering module of Swartz et al to accommodate the waveguide in the groove (137) as such optical beam efficiently reaches the mirror.

Swartz (US 5,625,483) which is parent case of the Swartz et al discloses a scanning device and teaches that the structure 20 generates a laser beam which is propagated through free space to a reflective structure 27 and the beam may be collimated or focused by a lens or other optical element (not shown) to from a beam of a suitable size, shape, and orientation prior to it reaching the reflective structure 27. See lines 20-25 of column 6. The teachings of Swartz (US 5,625,483) further add credence to the above well-known statement.

Thus, from available well know techniques and teachings of Swartz, the ordinary artisan would have found it to be obvious at the time of the invention to provide the

waveguide in the steering module of Swartz et al for the purpose of advantageously guiding the optical beam between the laser and the mirror.

Claims 48-50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Swartz et al, Swartz (US 5,625,483 which is parent case of Swartz et al), and Germann et al (WO 95/13638).

As to claims 48-50, Swartz et al fails to disclose a V shaped groove and an optical element disposed within the groove.

As discussed above, providing the optical element such as an optical waveguide in the groove would be within the reach of the ordinary skilled artisan from teachings of Swartz. As to the V shaped groove, it is certainly well known in the art to use a V-groove for the waveguide such as an optical fiber or other optical elements for efficiently aligning the laser to the optical fiber. Such teachings are provided in Germann et al. Germann et al discloses a hybrid laser system including a coupling of the laser to an optical fiber, wherein the optical fiber is placed in a V-groove formed on a substrate. As stated at lines 1-6 of page 7, the groove supports and aligns a fiber and improves coupling to the laser.

Thus, it would have been obvious at the time of the invention to utilize a V shaped groove for the groove disclosed in Swartz et al for the purpose of disposing the optical fiber in the groove and providing an efficiently alignment.

Claims 53-54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Swartz et al.

As to claims 53-54, Swartz et al substantially discloses the claimed limitations but fails to disclose a cover plate for covering the cavity and the substrate body.

As disclosed in Fig. 3 of Swartz et al, the substrate and silicon mirror is covered with a glass cover, which provides a protection against dust and other environmental effects. Also note that most of the scanning devices are provided with a transparent cover in order to use the devices for scanning.

From collective teachings of Swartz et al, the ordinary artisan would have found it obvious at the time of the invention to provide a glass cover for the embodiment of Fig. 9 in the Swartz et al for the purpose of advantageously protecting the steering module from dust.

Claims 59-69 are rejected under 35 U.S.C. 103(a) as being unpatentable over Swartz et al and Pember et al (GB 2 275 787 A).

Swartz et al, as discussed above, fails to disclose a frame for holding the set of hinges; a plurality of independently addressable electrodes for positioning the micromirror in direct electrical communication with a plurality of electrical lines; and electrical control means in communication with the electrical lines. However, in Fig. 3, Swartz et al discloses a frame structure including electrodes for the micromirror.

Pember et al discloses a silicon micro-mirror unit comprising a frame and micromirror (7) nested in a set of hinges (4) that provides an axis of rotation of the micromirror with respect to the frame. See Fig. 2.

In Fig. 3, Pember et al discloses a plurality of electrodes and electronic control means (9) in communication with the electrical lines for electrically driving the

micromirror. In the last paragraph at page 10, Pember et al states that the micromirror unit may be mounted on a base silicon wafer or in a hybrid chip package. The micromirror unit of Pember et al provides an efficient control over the micromirror and the device is compact and can be readily mounted on the substrate.

From collective teachings of Pember et al, the ordinary artisan would have found it to be obvious at the time of the invention to provide the frame structure in the steering device of Swartz et al for the purpose of reducing cost of the device and providing an efficiently control over the steering of the micromirror.

Claims 71-72 are rejected under 35 U.S.C. 103(a) as being unpatentable over Swartz et al.

Swartz et al, as discuss above, fails to disclose fixing of the beam steering assembly by chemical bonding or by thermal bonding.

As to claims 71-72, applicant is claiming the product including the process of attaching the steering assembly, and therefor is of "product-by-process" nature. The courts have been holding for quite some time that: the determination of the patentability of product-by-process claim is based on the product itself rather than on the process by which the product is made. In re Thrope, 777 F. 2d 695, 227 USPQ 964 (Fed. Cir. 1985); and patentability of claim to a product does not rest merely on a difference in the method by which that product is made. Rather, it is the product itself which must be new and unobvious. Applicant has chosen to claim the invention in the product form. Thus a prior art product which possesses the claimed product characteristics can anticipate or render obvious the claim subject matter regardless of the manner in which

it is fabricated. A rejection based on 35 U.S.C. section 102 or alternatively on 35 U.S.C. section 103 of the status is eminently fail and acceptable. In re Brown and Saffer, 173 USPQ 685 and 688; In re Pilkington, 162 USPQ 147.

As such no weight is given to the process steps recited in claims 71-72.

However note that attaching micro devices with chemical bonding agent or thermal bonding agent are alternative techniques well known in the art. As can be glean from Swartz et al reference that it is inherent that a chemical agent is used to adhere the hinged mirror onto the substrate.

Lacking a criticality in the specification as to the attachment technique for the steering assembly and does not solve any stated problem, the ordinary artisan would have found it to be obvious matter of design choice at the time of the invention to utilize a bonding technique from the available well known techniques which provides compatibility to the materials used for hinges of the micromirror.

Allowable Subject Matter

Claims 56-58 are allowed over the prior art of record. The following is a statement of reasons for the indication of allowable subject matter: The prior art fails to disclose or suggest the claimed hybrid optical steering system comprising the first and second substrate body arrangement as claimed in combination with all other claimed features.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Gale, Jr. et al, Germann et al, Wallace et al, Knipe et al, and Neukermans et al disclose different types of micromirror assemblies.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hemang Sanghavi whose telephone number is 703-305-3484. The examiner can normally be reached on Monday-Thursday (8:30 AM-6:00 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rodney Bovernick can be reached on 703-308-4819. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9318 for regular communications and 703-872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

Hemang Sanghavi
Primary Examiner
Art Unit 2874